

WHAT IS CLAIMED:

1. The method of testing a zero speed indicator for a machine while the machine is running under power consisting of the step of isolating the indicator from the machine and testing the zero speed indicating accuracy of the indicator.
2. The method of testing a zero speed indicator for a run down component of a machine while the machine is still running consisting of the step of uncoupling the component from the machine and testing the zero speed indicating accuracy of the indicator.
3. The method as set forth in claims 1 and 2 including the step of decelerating the movement of the indicators rundown component during testing to reduce the testing time.
4. The method of testing for zero speed indicating accuracy a zero speed indicator for a machine having intermittent motion wherein the machine is operated between a stop and start mode consisting of the step of testing the zero speed indicator while in its run down phase during the stopping mode thus testing the indicator without interrupting the operation or production capability of the machine.
5. The method of testing for zero speed indicating accuracy a zero speed indicator including the step of monitoring the motion of the machine and testing the zero speed indicator in response to controlled or emergency stopping of the machine or when lockout procedures call for power interruption.
6. The method of preventing the opening of a locked guard closure of a machine prior to the machine reaching zero speed consisting of the steps of providing a zero speed indicator that controls the unlocking of the guard closure and testing for zero speed indicating accuracy the zero speed indicator and if the zero speed indicator fails the test the guard closure will remain locked until the zero speed indicator is repaired or replaced.

Sub
C!
(Pmtg)

7. The method as set forth in claim 6 in which the step of maintaining the closure locked in response to a zero speed indicator failing the zero speed indicating accuracy test permits the machine to be restarted and production continued in spite of the presence of a known faulty zero speed indicator.

8. The method as set forth in claim 6 including the step of indicating that a given guard closure will remain locked due to a zero speed indicating accuracy test failure of the zero speed indicator and continuing to operate the machine.

9. The method of testing whether a machine is at zero speed to permit opening of a locked guard closure consisting of the step of attempting to insert an interference device into a receiving portion of a machine component and communicating the status of the interference device to a machine controller whereby if the interference is fully inserted the closure lock will be given permission to unlatch but if it cannot be fully inserted or deployed the closure will remain locked.

10. Apparatus for testing for zero speed indicating accuracy a zero speed indicator for moving components of a machine consisting of a motion detector connected to the moving components and moving at a speed proportional to that of the moving components, means for detaching the motion detector from the moving components, and means for testing the motion detector for zero speed indicating accuracy to determine if it performed correctly.

11. Apparatus as set forth in claim 10 in which the means for detaching the motion detector from the machine components consists of a declutching device.

12. Apparatus for testing for zero speed indicating accuracy a zero speed indicator for moving components of a machine consisting of a motion detector assembly including a motion detector and a run down component moving at a speed proportional to that of the moving

components and moving at a speed proportional to that of the moving components, means for detaching the run down component from the moving components and means for testing the motion detector for zero speed indicating accuracy to determine if it performed correctly.

13. Apparatus as set forth in claims 11 and 12 in which there is a braking device included to reduce the testing time.

14. Apparatus for insuring that the moving components of a machine have come to a complete stop during run down before a closure guarding same can be opened including a zero speed indicator for recording the speed of the moving components, sensing when the components have come to a complete stop and inserting an interference device preventing further movement of the moving components when the indicator measures zero speed.

15. The method as set forth in claims 1, 2, 4, 5, 6, 9 or 10 in which the indicator controls the opening of a guard including the steps of recording and indicating that the indicator did or did not properly indicate zero speed, and if it did not properly indicate zero speed the guard should remain locked and should not be allowed to be opened and to schedule necessary repair or replacement, and if the indicator properly functions to record and indicate that the indicator passed its zero speed indicating test.

16. The method as set forth in claim 15 including the steps of activating suitable warning indicators and devices if the indicator failed its test and schedule necessary repair and/or replacement of the failed indicator or then either postpone the repair or replacement for a later suitable time without shutting down the machine or shut down the machine due to test failures to perform the necessary repair and/or replacement of the failed indicator.

17. The method as set forth in claim 16 including the step of unlatching the guard closure when the machine is shut down so that repair or replacement of the failed indicator can take place.

18. The method of testing to determine if the conditions are present to unlatch a guard closure including the steps of testing the guard closure locks, the interlocks, the zero speed indicator, any timers or delay devices that are provided and any included interference systems and devices.

19. The method as set forth in claim 18 in which failure of any of the tests will result in the guard closure remaining locked and not be allowed to be opened and to schedule necessary repair or replacement, and if all the tests are passed to record and indicate that all tests have been passed and permission given to unlatch the guard closure.

20. The method of testing a zero speed indicator while a machine is running consisting of applying a suitable testing device to the indicator, uncoupling the indicator from the machine and testing to see if it uncoupled and if it did not uncouple indicate that the indicator cannot be tested, the guard closure cannot be unlocked and necessary repair or replacement will be scheduled and if the indicator did uncouple then test the indicator to see if it correctly determines and indicates zero speed during the run down phase.

21. The method as set forth in claim 20 in which after the indicator has passed all its tests it is recoupled and if recoupling occurs it will be so indicated and if it failed to recouple or failed any other tests this will be so indicated and the necessary repair or replacement will be scheduled.

22. The method of testing a zero speed indicator during the speed run down phases including those caused by machine stop initiations including the step of activating the zero speed

indicator and applying a suitable testing device to the indicator to test the indicator and if the indicator failed the test the guard closure remains locked and the necessary repair or replacement will be scheduled and if the indicator passed its test the testing device is removed from the indicator.

23. The method as set forth in claims 18, 19, 20, 21 or 22 including the steps of activating suitable warning indicators and devices if the indicator failed its test and then either postpone the repair or replacement for the later suitable time without shutting down the machine or shut down the machine due to test failures to perform the necessary repair and/or replacement of the failed indicator.

24. The method of inserting a motion interference device at the completion of machine rundown caused by machine stop initiations including the steps of signaling the machine to stop, using a tested and passed zero speed indicator to monitor the speed of the relevant machine member and if zero speed is indicated insert the interference device into position to block the movement of said machine member.

25. The method as set forth in claim 24 in which if the interference device cannot be inserted the guard closure cannot be unlocked and the necessary repair or replacement will be scheduled.

26. The method as set forth in claim 25 in which a warning device will be activated indicating that the interference device cannot be inserted.

27. The method as set forth in claims 20, 21 and 24 in which the testing of the indicator includes determining if the assigned monitoring times have been exceeded and if so the guard remains locked and then indicate that the test failed and the guard closure is not to be unlocked and the necessary repair or replacement will be scheduled.

28. The method of testing a zero speed indicator that does not contain a run down component for a machine while the machine is still running consisting of providing such indicator with a run down component, isolating the component from the machine and testing the zero speed indicating accuracy of the indicator.

jlm/w/4006805.p05

105449-436